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Indian Standard

METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION OF FABRICS: DIAPHRAGM METHOD

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METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION OF FABRICS: DIAPHRAGM METHOD

(First Revision)

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Indian Standard

METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION OF FABRICS: DIAPHRAGM METHOD

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 27 June 1975, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1961 and has been revised to make it up-to-date on the basis of the experience gained during its use and also to align it with ISO 2960-1974 ' Textile — Determination of bursting strength and bursting distension — Diaphragm method ' as far as possible. In this standard two test diameters (*see* **7.1** and **7.2**) have been specified to make provision for using available instruments having minor differences.

0.3 The test for tensile strength may be unsuitable for certain type of fabrics, such as knitted materials and lace, and for these textiles the measurement of bursting strength provides an alternative criterion of strength. The test may also be suitable for woven fabrics which are subjected to bursting pressures in use, for example, pump diaphragms and filter fabrics. In this test, the specimen breaks across the direction having the least breaking extension, but the bursting strength of the cloth cannot readily be calculated from its tensile strength in this direction since it is influenced by other aspects of the response of the fabric to biaxial stressing.

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

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*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes a method for the determination of bursting strength and bursting distension of woven and knitted fabrics and felts.

1.1.1 The method prescribed in this standard is applicable to all textile fabrics, irrespective of their composition (that is, whether the fabric is made of cotton, wool, silk, jute or man-made fibres or a blend of two or more such fibres) and history (that is, the manufacturing processes involved and the finishing treatments).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Bursting Strength — The maximum fluid pressure applied to a circular specimen in distending it to rupture. It is expressed in kilogram force per square centimetre (kgf/cm^2) or kilonewtons per square metre (kN/m^2).

NOTE — $1\ kN/m^2 = \frac{kgf/cm^2}{102}$

2.2 Bursting Distension — The distension of a specimen at the bursting pressure. It is the maximum height in millimetres achieved at the time of bursting by the centre of the upper surface of the specimen during the test.

3. PRINCIPLE

3.1 A specified area of the sample of fabric under test is clamped over an elastic diaphragm by means of a flat annular clamping ring, and an increasing fluid pressure is applied to the underside of the diaphragm until the specimen bursts. The operating fluid may be either a liquid or a gas.

4. SAMPLING

4.1 Samples shall be selected so as to be representative of the lot.

4.2 Samples drawn in accordance with the procedure laid down in the material specification or as agreed to between the buyer and the seller shall be taken as representative of the lot.

5. TEST SPECIMENS

5.1 From the test sample, cut out at least 10 test specimens each 250 × 250 mm or 75 × 75 mm in size, by drawing one test specimen (*see* Note) from each of the pieces constituting the test sample; these shall constitute the test specimens.

NOTE — More than one test specimen may be cut out of one or more sample pieces to make up for 10 test specimens.

5.1.1 The system of clamping used generally permits tests to be applied without cutting out specimens (which may be resorted to, if desired). The sample of fabric available may sometimes be in one or more pieces but it should be possible to test it at 10 places. The 10 test areas shall be so distributed as to be representative of the sample and avoiding selvedges, creased or wrinkled places, and other such non-representative areas of the sample.

CAUTION: *No portion of the material that has previously been gripped in the specimen clamp shall be used for a subsequent test.*

6. ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

6.1 The conditioning and testing shall be carried out in standard atmosphere at 65 ± 2 percent relative humidity and 27 ± 2°C temperature (*see also* IS : 6359-1971*).

6.2 Prior to evaluation, the test specimens shall be conditioned to moisture equilibrium in the standard atmosphere (*see* Note).

NOTE — For guidance purposes, it may be noted hat the minimum time required to reach moisture equilibrium for the various types of textile materials having moisture regain less than 5 percent is about 6 hours while the same for those having moisture regain more than 5 percent is 24 hours.

7. APPARATUS

7.1 For Test Diameter of 113 mm

7.1.1 The bursting strength tester shall have a flat base plate of diameter at least 140 mm, covered by a flat diaphragm of rubber or similar material (of thickness not more than 1 mm). A central hole in the base plate shall allow a controlled increase in fluid pressure to be applied to the underside of the diaphragm, so that the specimen bursts in 20 ± 3 seconds. The rate of flow of fluid through the hole in the base plate shall not vary more than ±20 percent throughout the test.

7.1.2 A clamping ring of internal diameter 113·00 ± 0·05 mm and of external diameter 140 mm (*Min*) shall be provided with a flat lower surface to hold the specimen firmly against the diaphragm at all points.

7.1.3 The lower face of the clamping ring may be lined with a thin layer of cork or other compressible material suitable for the fabric under test; if the face is unlined, its inner edge (or inner periphery) shall have a radius of 0·5 mm.

7.1.4 Means shall be provided for applying the clamping ring with sufficient pressure to prevent the fabric specimen from slipping during the test. The specimen shall not be damaged by the action of the clamping ring.

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*Method for conditioning of textiles.

7.1.5 Provision shall be made for indicating or recording the pressure under the diaphragm at any point in the range in which the machine is used to an accurancy of ±1 percent. Means shall be provided for indicating or recording the bursting distension of the specimen to an accuracy of ±0·25 mm.

7.2 For Test Diameter of 30·5 mm

7.2.1 All conditions shall be the same as in **7.1.1** to **7.1.5** except that the diameter of the base plate shall be at least 55 mm and the internal and external diameters of the clamping ring shall be 30·50 ± 0·05 mm and 55 mm (*Min*); respectively.

8. PROCEDURE

8.1 Place the test specimen or the area of the sample to be tested over the diaphragm so that it lies in a flat tensionless condition. Clamp it securely by means of the clamping ring. Increase the pressure smoothly so that the bursting strength of the fabric is reached in 20 ± 3 seconds.

8.1.1 Note the bursting strength and the bursting distension of the specimen. If the specimen bursts close to the edge of the clamping ring, record this fact and discard the reading, and carry out another test in lieu thereof.

8.1.2 Repeat the test with other test specimens or at other places on the test sample, as the case may be, to have at least 10 acceptable measurements.

8.2 Diaphragm Correction — With the same rate of fluid flow as employed in the above test, distend the diaphragm, without the presence of a specimen, but with the clamping ring in position, and note the pressure required to distend it by an amount equal to the average distension of the specimens. The pressure is the ' diaphragm correction '.

9. CALCULATION

9.1 Calculate the arithmetic mean of the measured values of bursting strength and from this subtract the diaphragm correction.

9.2 Express the arithmetic mean of the bursting distensions of the specimens selected for the calculation of bursting pressure to the nearest 2 percent.

10. TEST REPORT

10.1 The test report shall include the following information:

a) Mean bursting strength in kilogram force per square centimetre or kilonewtons per square metre;
b) Diaphragm correction;
c) Mean bursting distension; and
d) The type and capacity of the machine, the pressure range at which it was operated, and the test diameter of the specimen.

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AMENDMENT NO. 1 MARCH 2000
TO
IS 1966 : 1975 METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION OF FABRICS : DIAPHRAGM METHOD

(First Revision)

(*Page* 6, *clause* 7.1.5, *line* 1) — Insert the following as the first sentence of the clause:

'The capacity of the tester shall be such that the individual readings shall not be less than 25 percent nor more than 75 percent of the total capacity of the tester.'

(*Page* 6, *clause* 7.1.5) — Insert a new clause after 7.1.5 as under:

'7.1.6 Pieces of pre-tested aluminium sheet having a known bursting strength in the range of 70 to 790 kPa shall be periodically used for calibration and checking the overall performance of tester.'

(TX 01)

Reprography Unit, BIS, New Delhi, India